

12 **EUROPEAN PATENT APPLICATION**

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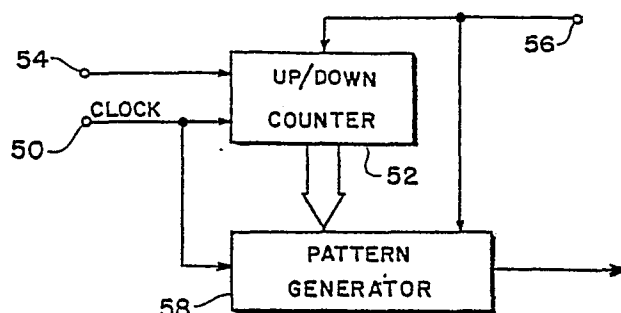
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54 **Filtering and frequency detection circuits for delta modulated signals.**

57 High and low pass filters and frequency detection circuitry responsive to the pulse train output of a linear delta modulator which generates a stream of positive and negative going output pulses, the average of which correspond to an analog input signal to said delta modulator. The filter circuits (52, 58) determine the slope of the output pulse average by counting the number of positive (1) and negative (0) going pulses during a predetermined interval and alters the sign of certain output pulses if the slope is higher than a predetermined slope value in the case of a low pass filter but lower than a predetermined value in the case of a high pass filter. The frequency detector circuitry employs an up/down counter to detect the zero crossover point of the output pulse waveform by sensing the point when the number of one pulses exceeds the number of zero pulses, or vice versa, and measures the time between those crossover points.





DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl. ³)
A	FR-A-2 144 267 (IBM) * Claim 2 *	1,7	H 04 B 12/04 H 04 B 14/06
A	FR-A-2 277 466 (CIT-ALCATEL) * Page 2, lines 13-22 *	1,7	
A	DE-A-1 920 174 (SIEMENS) * Claim 2 *	1,7	
A	THE RADIO AND ELECTRONIC ENGINEER, vol. 48, no. 9, September 1978, pages 431-438, London, GB; N. KOUVARAS: "Operations on deltamodulated signals and their application in the realization of digital filters" * Page 436, left-hand column, line 1 - page 437, left-hand column, line 15; figures 7-10 *	1	
A	THE RADIO AND ELECTRONIC ENGINEER, vol. 42, no. 12, December 1972, pages 547-551, London, GB; G.B. LOCKHART: "Digital encoding and filtering using delta modulation" * Page 547, right-hand column, line 20 - page 548, right-hand column, line 32; figure 2 *	1	
The present search report has been drawn up for all claims			TECHNICAL FIELDS SEARCHED (Int. Cl. ³) H 04 B H 03 H H 03 K
Place of search THE HAGUE		Date of completion of the search 18-12-1984	Examiner LUBERICH S A.
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			



DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl. ³)
A	ELECTRONICS, vol. 50, no. 21, 13th October 1977, pages 86-93, New York, USA; R. STEELE: "Chip delta modulators revive designers' interest" * Page 92, left-hand column, line 14 - right-hand column, line 16; figure 9 *	1	TECHNICAL FIELDS SEARCHED (Int. Cl. ³)
A	--- IEEE TRANSACTIONS ON COMMUNICATIONS, vol. COM-28, no. 6, June 1980, pages 801-806, New York, USA; D.P. PREZAS et al.: "A delta modulation filter for speech-type signals" * Page 802, left-hand column, line 8 - page 804, left-hand column, line 20; figures 3,4 *	1	
A	--- IBM TECHNICAL DISCLOSURE BULLETIN, vol. 14, no. 9, February 1972, pages 2668-2670, New York, USA; J.A. BESSEYRE: "All-digital binary filter" * Whole document *	1	

The present search report has been drawn up for all claims			
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X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document	